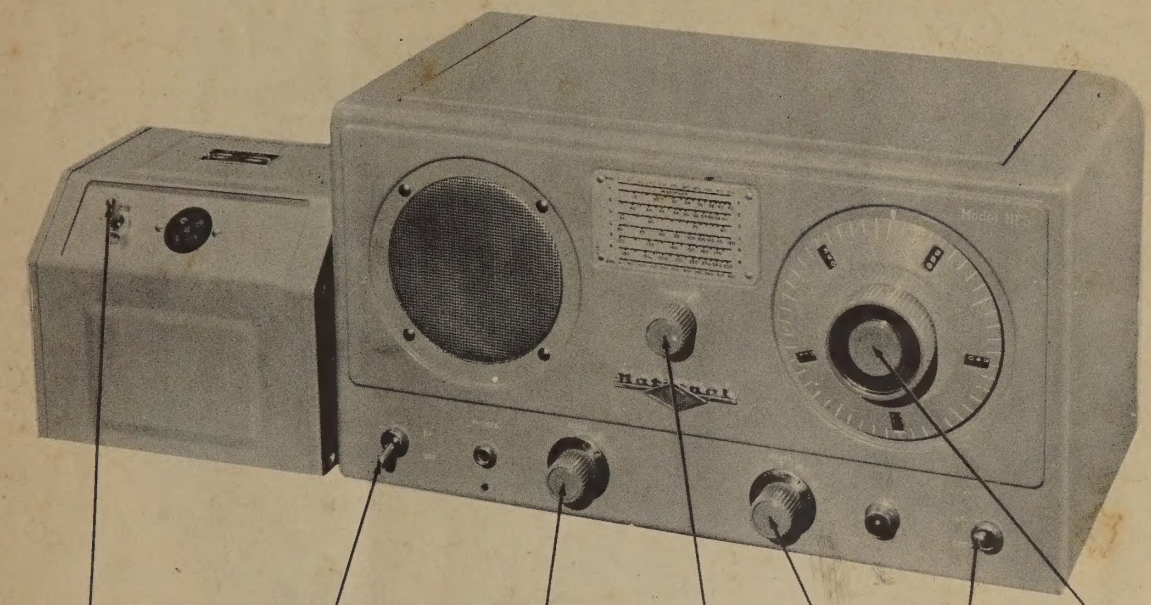

NATIONAL
MODEL HFS

NATIONAL
MODEL HFS

NATIONAL MODEL HFS

TRADE NAME	National, Model HFS
MANUFACTURER	National Company, Inc., Malden, Mass.
TYPE SET	AC or Battery Operated Multi-Band Superheterodyne Receiver
TUBES(EIGHT)	Types 6AK5 Mixer, 9002 Oscillator, 6SG7 IF Amp., 6SK7 Detector, 6J5 Cathode Follower, 6J5 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier
POWER SUPPLY	110-120, 220-240 Volts AC or 6 Volt Storage Battery
RATING	.36 Amp. @ 117 Volts AC
TUNING RANGE-	Band F 27-42MC, Band E 41-60MC, Band D 56-80MC, Band C 80-120MC, Band B 120-178MC, Band A 178-250MC.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect the high side of the signal generator through .001 MFD shunted by 50KΩ resistor to the grid pin of the first detector coil socket. This will necessitate the removeable of the 1st detector coil from its socket. Connect low side of signal generator to chassis. Pre-set the front panel controls as follows: Audio------To desired volume
Int.-Ext.--Internal
Regeneration--Set for background hiss. (Approx. 4 on Knob Scale)
Absence of the background hiss indicates that the regeneration control and /or the signal generator should be retarded.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.001MFD Shunted by 50KΩ	See Pre-alignment instructions.	10.7MC (400~ Mod)	Point of Non-interference	Across voice coil	A1, A2 A3	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 7, Indiana

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DATE 5/49 4910-14 SET #62 FOLDER 14

PARTS LIST AND DESCRIPTIONS

NATIONAL MODEL HFS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mixer		6AK5	7BD	
V2	Oscillator		9002	7TM	
V3	IF Amp.		6SG7	8BK	
V4	Detector		6SK7	8N	
V5	Cath. Follower		6J5	6Q	
V6	AF Amp.		6J5	6Q	
V7	Power Output		6V6GT	7AC	
V8	Rectifier		5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	8	475		E450-8-8-8	UP		D1-3x8-	TVL-33‡	Filter
B	8	475			11145C†		450		"
C	8	475							"
C2	10	50		PRS50/10	BR105		M-10-50	TA-510	Output Cath. Bypass
C3	10	50		PRS50/10	BR105		M-10-50	TA-510	AF Cath. Bypass
C4	100								Fixed Trimmer
C5	100								" "
C6	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Ant. Coupling
C7	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	" "
C8	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	RF Coupling
C9	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Mixer Screen Bypass
C10	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	Mixer Plate Decoup.
C11	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Osc. Grid Cap.
C12	6200	500		1467-006	1D5D6	GP2-335-0075	MW.5-26	1FM-26	IF Cath. Bypass
C13	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	IF Screen Bypass
C14	100			1468-0001	5W5T1	GP1K-100	MO.5-31	1FM-31	IF Coupling
C15	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	" "
C16	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	RF Filter
C17	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	" "
C18	6200	500		1467-006	1D5D6	GP2-335-0015	MW.5-26	1FM-26	Det. Plate Bypass
C19	3					NPOK-3			IF Coupling
C20	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	" "
C21	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	Cath. Follower Plate
C22	.5	200		430-5	DYR6050		XDMR6-5	TC-5	Det. Plate Decoup.
C23	.1	400		P488-1	GT4P1		ST-4-1	TM-1	Audio Coupling
C24	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	RF Bypass

† Omit bypass section.
‡ Install mounting plate.

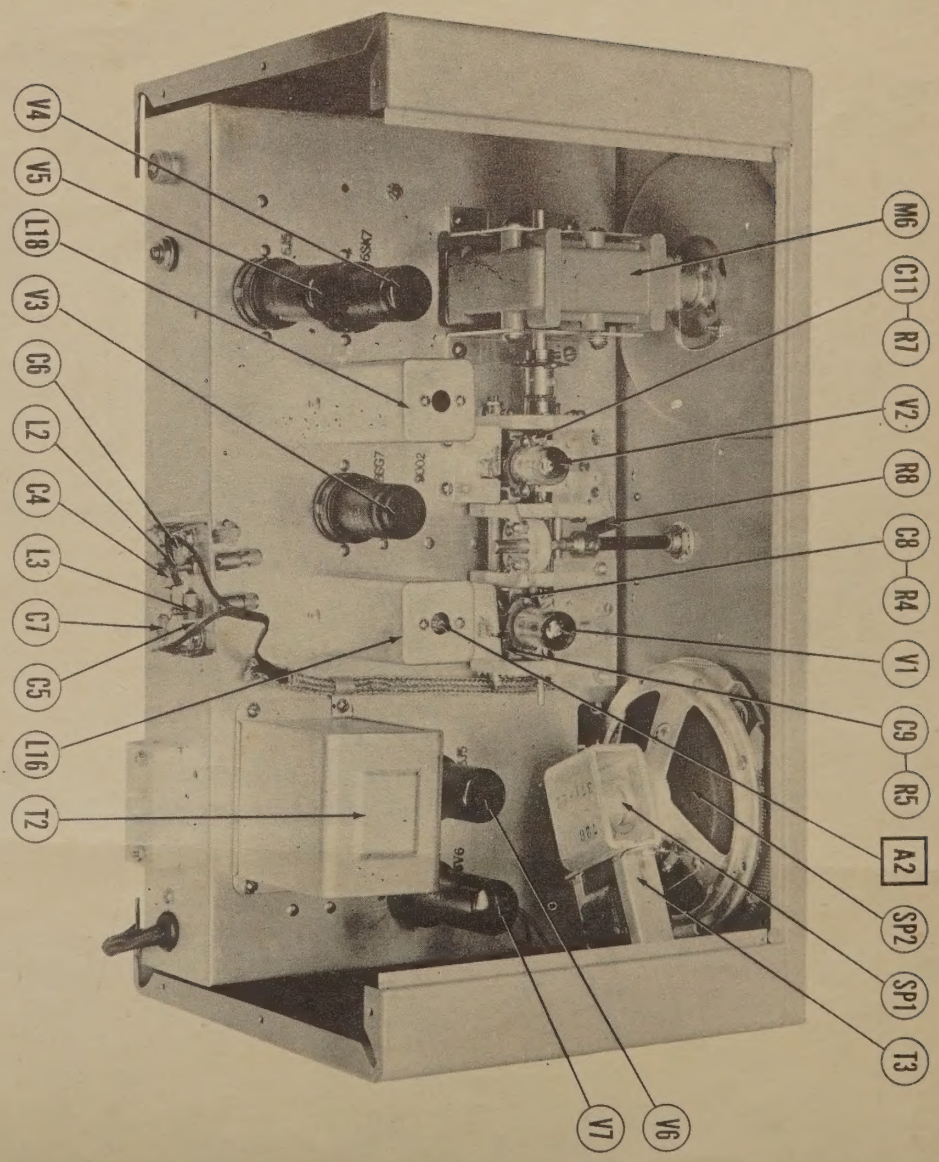
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½		D13-133	M-60-Z	Audio Gain Control
B	Shaft			A	Not Req.	Attach to R1A Per Instructions
R2A	50KΩ	½		D11-123	M-44-S	Regeneration Control
B	Shaft			A	Not Req.	Attach to R2A Per Instructions
R3	1000Ω	½		W-1000	43-1000	Cathode Follower Output Control

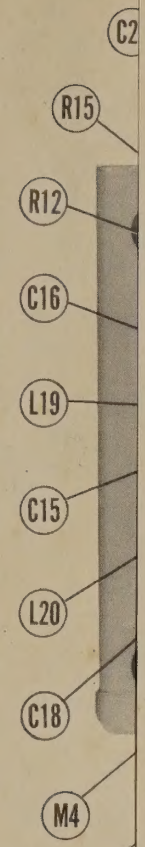
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	IDENTIFICATION CODES	
R4	270KΩ	½		BTS-270K	Red-Vi.-Yl.	Mixer Grid
R5	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn.	Mixer Screen Decoupling
R6	1000Ω	½		BTS-1000	Br.-Blk.-Red	Mixer Decoupling
R7	47KΩ	½		BTS-47K	Yl.-Vi.-Or.	Osc. Grid
R8	10KΩ	1		BTA-10K	Br.-Blk.-Or.	Osc. Plate Decoupling
R9	220Ω	1		BW-1-220	Red-Red-Br.	IF Cathode
R10	22KΩ	½		BTS-22K	Red-Red-Or.	IF Screen

CHASSIS—TOP VIEW



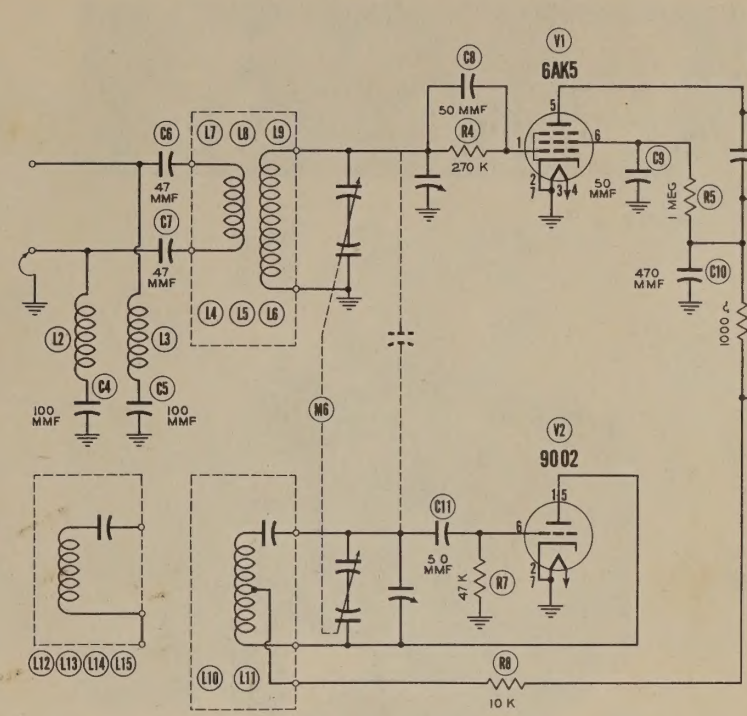
CHASSIS—BOTTOM VIEW

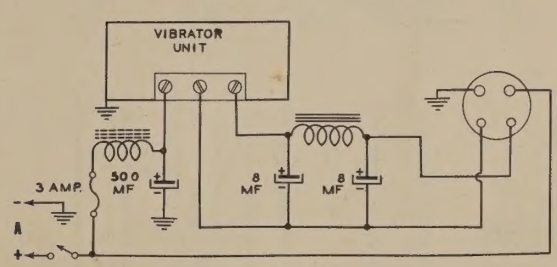


PARTS LIST AND DESCRIPTIONS (Continued)

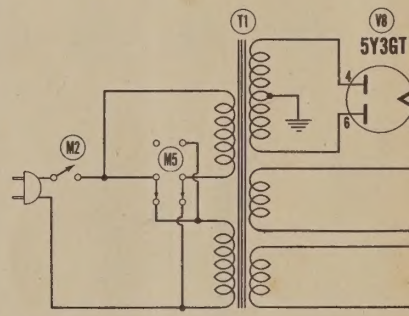
RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA NATIONAL PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
R11	470Ω	½		BW-½-47	Y1.-Y1.-Blk. Det. Feedback
R12	10 Meg	½		BMS-10 Meg	Br.-Blk.-Blue Pot. Grid Leak





686S POWER UNIT



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AK5	-.5VDC	0V	0V	6.3VAC	175VDC	28VDC	0V	
V 2	9002	135VDC	0V	0V	6.3VAC	135VDC	§-9.8VDC	0V	
V 3	6SG7	0V	6.3VAC	2VDC	0V	2VDC	125VDC	0V	175VDC
V 4	6SK7	0V	6.3VAC	10VDC	.1VDC	.3VDC	10VDC	0V	10VDC
V 5	6J5	0V	0V	130VDC	0V	0V	0V	6.3VAC	2.6VDC
V 6	6J5	0V	0V	95VDC	0V	0V	0V	6.3VAC	4VDC
V 7	6V6GT	0V	6.3VAC	165VDC	180VDC	0V	0V	0V	11VDC
V 8	5Y3GT	0V	220VDC	0V	210VAC	0V	210VAC	0V	220VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

THE COOPER
RECEIVER MAKE

1. DC Voltage measur
measured at 1,000 c
2. Socket connections
3. Measured values are
4. Line voltage mainta
5. Nominal tolerance
± 10% in voltage
6. Volume control at
ments.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PARTS LIST AND DESCRIPTIONS

NATIONAL MODEL HFS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mixer	6AK5	6AK5	7BD	
V2	Oscillator	9002	9002	7TM	
V3	IF Amp.	6SG7	6SG7	8BK	
V4	Detector	6SK7	6SK7	8N	
V5	Cath. Follower	6J5	6J5	6Q	
V6	AF Amp.	6J5	6J5	6Q	
V7	Power Output	6V6GT	6V6GT	7AC	
V8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	8	475		E450-8-8-8	UP		D1-3x8-	TVL-334	Filter
B	8	475			11145C†		450		"
C	8	475							"
C2	10	50		PRS50/10	BR105		M-10-50	TA-510	Output Cath. Bypass
C3	10	50		PRS50/10	BR105		M-10-50	TA-510	AF Cath. Bypass
C4	100								Fixed Trimmer
C5	100								" "
C6	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Ant. Coupling
C7	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	" "
C8	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	RF Coupling
C9	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Mixer Screen Bypass
C10	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	Mixer Plate Decoup.
C11	50			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	Osc. Grid Cap.
C12	6200	500		1467-006	1D5D6	GP2-335-0075	MW.5-26	1FM-26	IF Cath. Bypass
C13	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	IF Screen Bypass
C14	100			1468-0001	5W5T1	GP1K-100	MO.5-31	1FM-31	IF Coupling
C15	47			1468-00005	5W5Q5	GP1K-50	MO.5-45	1FM-45	" "
C16	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	RF Filter
C17	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	" "
C18	6200	500		1467-006	1D5D6	GP2-335-0015	MW.5-26	1FM-26	Det. Plate Bypass
C19	3					NPOK-3			IF Coupling
C20	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	" "
C21	470	500		1468-0005	5W5T5	GP2K-500	MO.5-35	1FM-35	Cath. Follower Plate
C22	.5	200		430-5	DYR6050		XDMR6-5	TC-5	Det. Plate Decoup.
C23	.1	400		P488-1	GT4P1		ST-4-1	TM-1	Audio Coupling
C24	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	RF Bypass

† Omit bypass section.
‡ Install mounting plate.

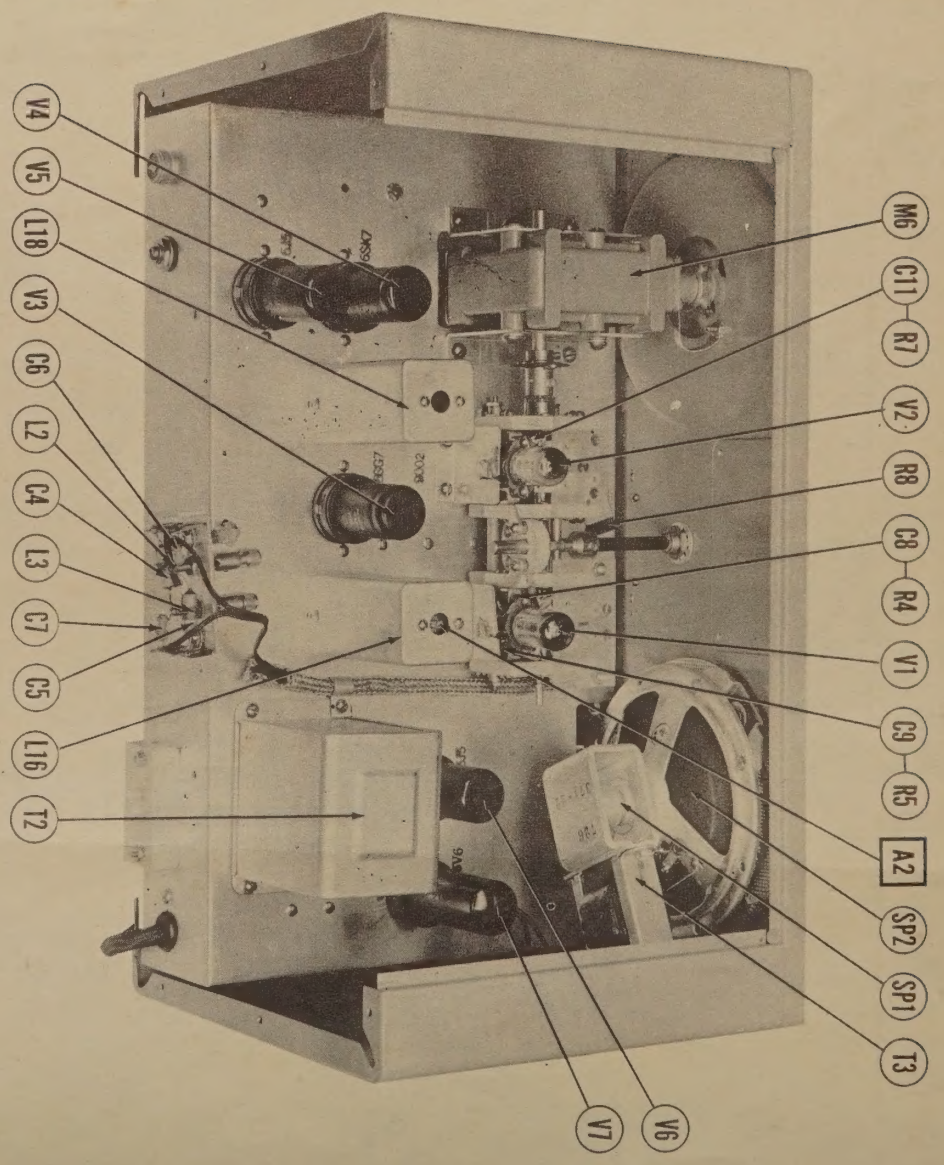
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½		D13-133	M-60-Z	Audio Gain Control
B	Shaft			A	Not Req.	Attach to R1A Per Instructions
R2A	50KΩ	½		D11-123	M-44-S	Regeneration Control
B	Shaft			A	Not Req.	Attach to R2A Per Instructions
R3	1000Ω	½		W-1000	43-1000	Cathode Follower Output Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	IDENTIFICATION CODES	
R4	270KΩ	½		BTS-270K	Red-Vi.-Yl.	Mixer Grid
R5	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn.	Mixer Screen Decoupling
R6	1000Ω	½		BTS-1000	Br.-Blk.-Red	Mixer Decoupling
R7	47KΩ	½		BTS-47K	Yl.-Vi.-Or.	Osc. Grid
R8	10KΩ	1		BTA-10K	Br.-Blk.-Or.	Osc. Plate Decoupling
R9	220Ω	1		BW-1-220	Red-Red-Br.	IF Cathode
R10	22KΩ	½		BTS-22K	Red-Red-Or.	IF Screen

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS

NATIONAL MODEL HFS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Mixer	6AK5	6AK5	7BD	
V2	Oscillator	9002	9002	7TM	
V3	IF Amp.	6SG7	6SG7	8BK	
V4	Detector	6SK7	6SK7	8N	
V5	Cath. Follower	6J5	6J5	6Q	
V6	AF Amp.	6J5	6J5	6Q	
V7	Power Output	6V6GT	6V6GT	7AC	
V8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	8	475		E450-8-8-8	UP		D1-3x8-450	TVL-33‡	Filter
B	8	475			11145C†				"
C	8	475							"
C2	10	50		PRS50/10	BR105		M-10-50	TA-510	Output Cath. Bypass
C3	10	50		PRS50/10	BR105		M-10-50	TA-510	AF Cath. Bypass
C4	100								Fixed Trimmer
C5	100								"
C6	47			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	Ant. Coupling
C7	47			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	" "
C8	50			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	RF Coupling
C9	50			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	Mixer Screen Bypass
C10	470	500		1468-0005	5W5T5	GP2K-500	M0.5-35	1FM-35	Mixer Plate Decoup.
C11	50			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	Osc. Grid Cap.
C12	6200	500		1467-006	1D5D6	GP2-335-0075	MW.5-26	1FM-26	IF Cath. Bypass
C13	470	500		1468-0005	5W5T5	GP2K-500	M0.5-35	1FM-35	IF Screen Bypass
C14	100			1468-0001	5W5T1	GP1K-100	M0.5-31	1FM-31	IF Coupling
C15	47			1468-00005	5W5Q5	GP1K-50	M0.5-45	1FM-45	" "
C16	470	500		1468-0005	5W5T5	GP2K-500	M0.5-35	1FM-35	RF Filter
C17	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	" "
C18	6200	500		1467-006	1D5D6	GP2-335-0015	MW.5-26	1FM-26	Det. Plate Bypass
C19	3					NPOK-3			IF Coupling
C20	470	500		1468-0005	5W5T5	GP2K-500	M0.5-35	1FM-35	"
C21	470	500		1468-0005	5W5T5	GP2K-500	M0.5-35	1FM-35	Cath. Follower Plate
C22	.5	200		430-5	DYR6050		XDMR6-5	TC-5	Det. Plate Decoup.
C23	.1	400		P488-1	GT4P1		ST-4-1	TM-1	Audio Coupling
C24	10000	300		1467-01	1D3S1	GP2-335-01	MW.3-11	1FM-11	RF Bypass

† Omit bypass section.
‡ Install mounting plate.

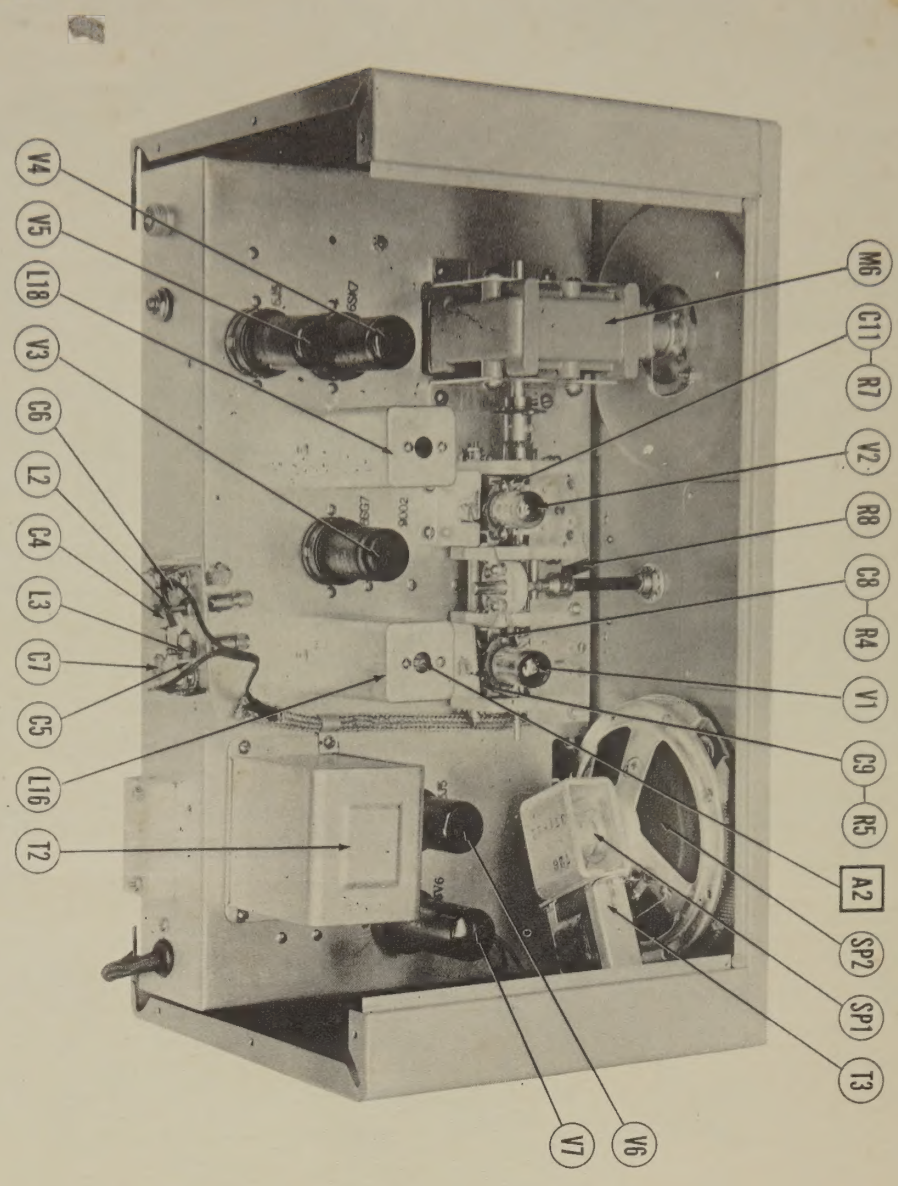
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
R1A	500KΩ	½		D13-133	M-60-Z	Audio Gain Control
B	Shaft			A	Not Req.	Attach to R1A Per Instructions
R2A	50KΩ	½		D11-123	M-44-S	Regeneration Control
B	Shaft			A	Not Req.	Attach to R2A Per Instructions
R3	1000Ω	½		W-1000	43-1000	Cathode Follower Output Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	IDENTIFICATION CODES	
R4	270KΩ	½		BTS-270K	Red-Vi.-Yl.	Mixer Grid
R5	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn.	Mixer Screen Decoupling
R6	1000Ω	½		BTS-1000	Br.-Blk.-Red	Mixer Decoupling
R7	47KΩ	½		BTS-47K	Yl.-Vi.-Or.	Osc. Grid
R8	10KΩ	1		BTA-10K	Br.-Blk.-Or.	Osc. Plate Decoupling
R9	220Ω	1		BW-1-220	Red-Red-Br.	IF Cathode
R10	22KΩ	½		BTS-22K	Red-Red-Or.	IF Screen

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	IRC PART No.	IDENTIFICATION CODES	
R11	47Ω	½		BW-½-47	Yl.-Vi.-Blk.	Det. Feedback
R12	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue	Det. Grid Leak
R13	5000Ω	½		BTS-4700	Grn.-Blk.-Red	Cathode Follower Plate
R14	470KΩ	½		BTS-470K	Yl.-Vi.-Yl.	Cathode Follower Grid
R15	33ΩΩ	½		BTA-330	Or.-Or.-Br.	Cathode Follower Cathode
R16	150KΩ	1		BTA-150K	Br.-Grn.-Yl.	Voltage Dropping
R17	4700Ω	½		BTS-4700	Yl.-Vi.-Red	AF Cathode
R18	470KΩ	½		BTS-470K	Yl.-Vi.-Yl.	Output Grid
R19	470Ω	½		BT-2-470	Yl.-Vi.-Br.	Output Cathode
R20	100KΩ	½		BTS-100K	Br.-Blk.-Yl.	AF Plate

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.
T1	115/230 VAC 117VAC @ .36A	430VAC CT @ .040A	5VAC @ 2A	6.5VAC @ 2.2A	Part of unit 5886			

TRANSFORMER (INTERSTAGE)

ITEM No.	RATING: TURNS RATIO PRI.	RATING: TURNS RATIO SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	INSTALLATION NOTES
T2	1 to 3		8.5KΩ	15KΩ				A-2911 #	# Drill new mtg. holes

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	INSTALLATION NOTES
T3	5KΩ	3.5Ω	580Ω	.8Ω		A-3877	RO-302	A-2930	

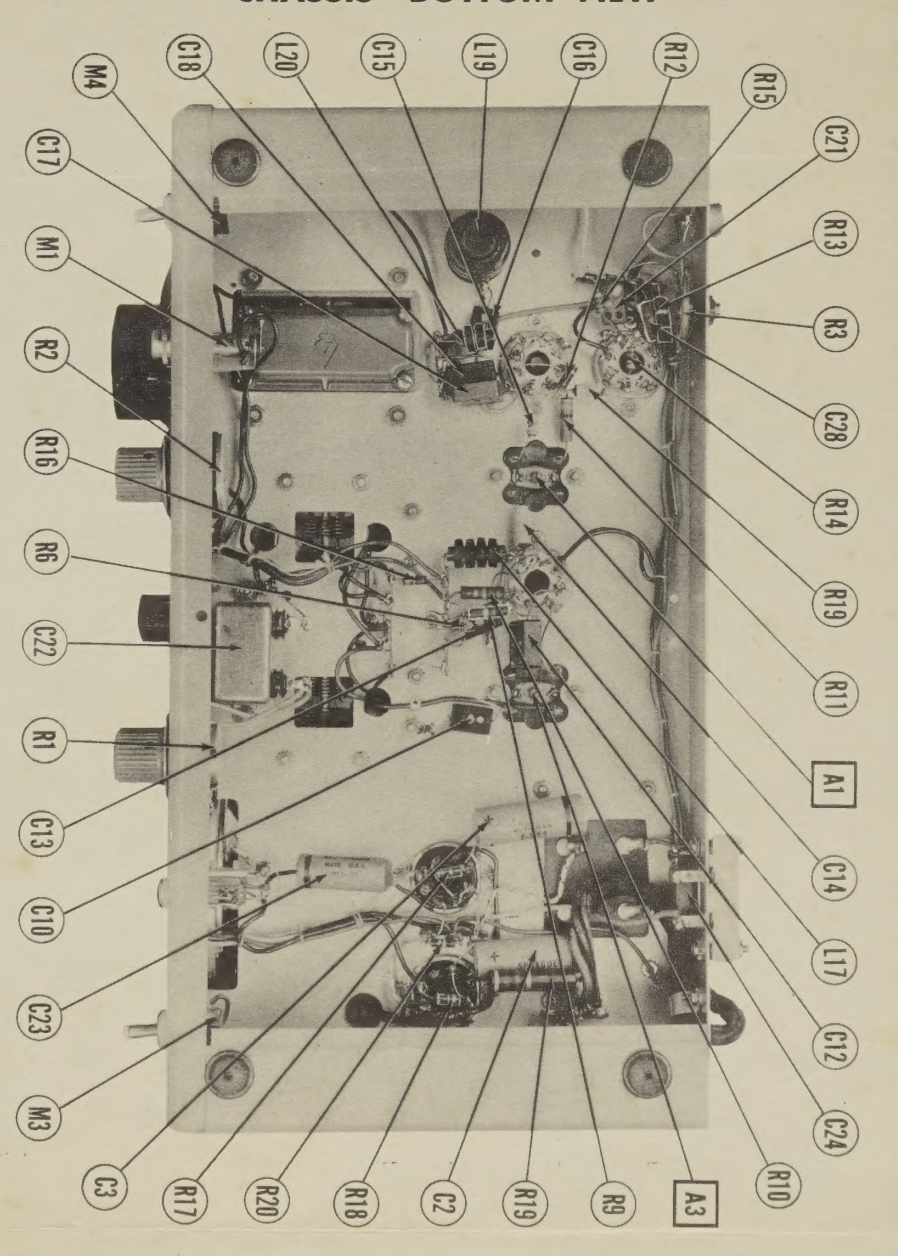
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: NATIONAL PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
SP1	FIELD PM	V. C. IMP. 3.5Ω		ST-105 MOD. P5-X*	5A1	* Remount output transformer.
SP2	CONE DIA. 4 3/4"	V. C. DIA. 9/16"				

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: NATIONAL PART No.	STANCOR PART No.	CHICAGO PART No.	MERIT PART No.	INSTALLATION NOTES
L1	.040A	920Ω Tapped @ 460Ω	17Henry	Part of unit 5886				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

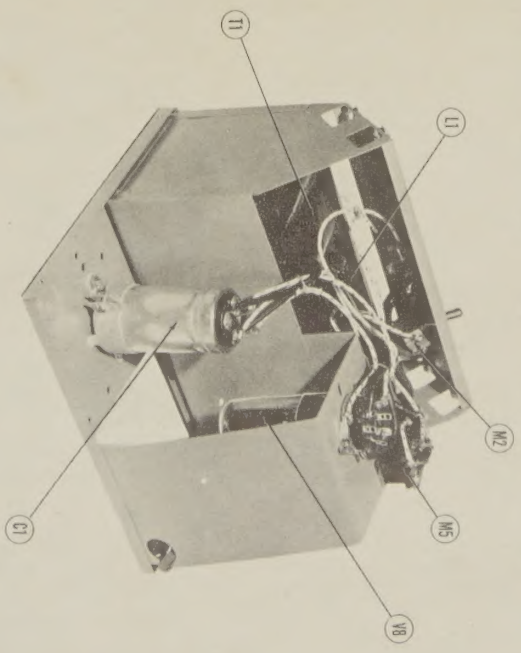
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: MEISSNER PART No.	
L2	IF Trap	.1Ω				
L3	IF Trap	.1Ω				
L4	Mixer Grid	0Ω	0Ω			Band A
L5	Mixer Grid	0Ω	0Ω			Band B
L6	Mixer Grid	0Ω	0Ω			Band C
L7	Mixer Grid	0Ω	0Ω			Band D
L8	Mixer Grid	0Ω	0Ω			Band E
L9	Mixer Grid	0Ω	0Ω			Band F
L10	Osc. Coil	0ΩCT				Band A Osc. Padder is 125MMF
L11	Osc. Coil	0ΩCT				Band B Osc. Padder is 116MMF
L12	Osc. Coil	0Ω				Band C Osc. Padder is 95MMF
L13	Osc. Coil	0Ω				Band D Osc. Padder is 75MMF
L14	Osc. Coil	0Ω				Band E Osc. Padder is 75MMF
L15	Osc. Coil	0Ω				Band F Osc. Padder is 76MMF
L16	Input IF	0Ω	0Ω	SA3697		
L17	IF Plate Chk.	40Ω				
L18	Output IF	.1Ω		SA4384		
L19	RF Choke	1000Ω				
L20	RF Choke	18Ω				

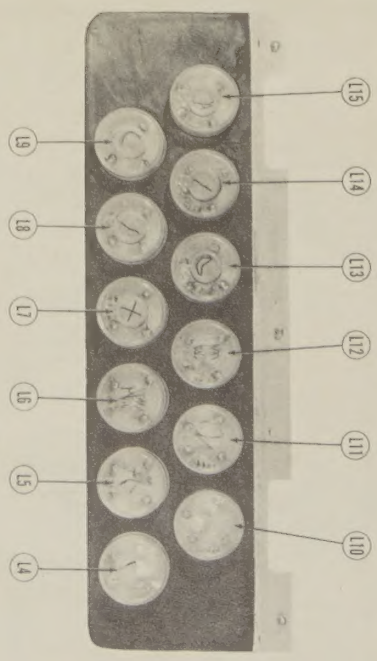
DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: NATIONAL PART No.		NOTES
M1	Bayonet	6-8V	0.15A	Brown			Type #47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
M2	Switch		Power
M3	Switch		B+
M4	Switch		Internal-External
M5	Switch		115-230V
M6	Tuning Gang		





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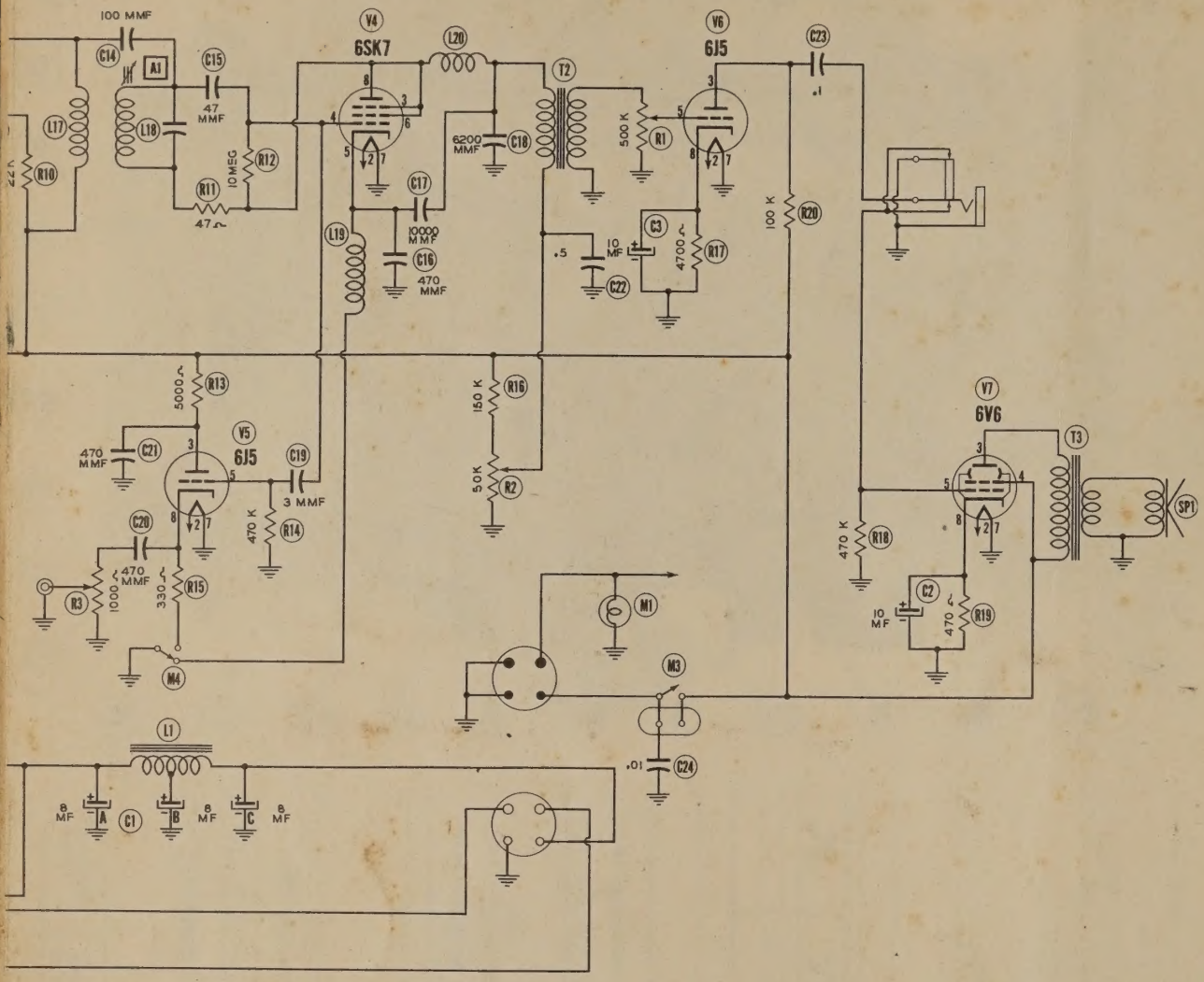


IF = 10.7 MC

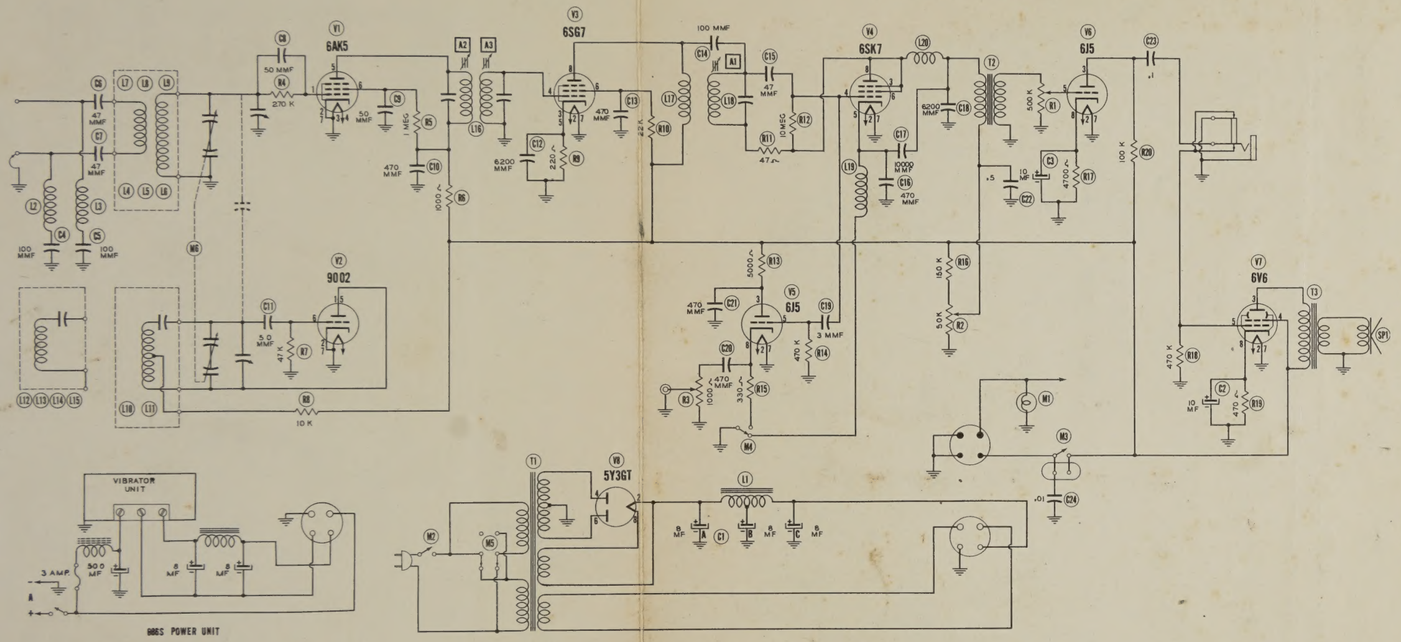
RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AK5	270KΩ	0Ω	0Ω	.2Ω	*2KΩ	1 Meg.	0Ω	
V 2	9002	*10KΩ	0Ω	0Ω	.2Ω	*10KΩ	65KΩ	0Ω	
V 3	6SG7	0Ω	.2Ω	230Ω	0Ω	230Ω	23KΩ	0Ω	*950Ω
V 4	6SK7	0Ω	.2Ω	52KΩ	10 Meg.	1000Ω	52KΩ	0Ω	52KΩ
V 5	6J5	0Ω	0Ω	*6KΩ	Inf.	540KΩ	Inf.	.2Ω	380Ω
V 6	6J5	0Ω	0Ω	*100KΩ	Inf.	8KΩ	0Ω	.2Ω	4.7KΩ
V 7	6V6GT	0Ω	.2Ω	*150Ω	*900Ω	470KΩ	Inf.	0Ω	470Ω
V 8	5Y3GT	Inf.	90KΩ	Inf.	260Ω	Inf.	260Ω	Inf.	90KΩ

* Measured from pin 8 of V8

TION OF THE MANUFACTURER OF THIS
IT POSSIBLE TO BRING YOU THIS SERVICE

nents are at 20,000 ohms per volt; AC Voltages
ms per volt.
e shown as bottom views.
rom socket pin to common negative.
ed at 117 volts for voltage readings.
component values makes possible a variation of
d resistance readings.
aximum, no signal applied for voltage measure-



IF=10.7 MC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AK5	-.5VDC	0V	0V	6.3VAC	175VDC	28VDC	0V	
V 2	9002	138VDC	0V	0V	6.3VAC	138VDC	5-9.8VDC	0V	
V 3	6SG7	0V	6.3VAC	2VDC	0V	2VDC	125VDC	0V	175VDC
V 4	6SK7	0V	6.3VAC	10VDC	.1VDC	.3VDC	10VDC	0V	10VDC
V 5	6J5	0V	0V	120VDC	0V	0V	0V	6.3VAC	2.6VDC
V 6	6J5	0V	0V	95VDC	0V	0V	0V	6.3VAC	4VDC
V 7	6V6GT	0V	6.3VAC	165VDC	180VDC	0V	0V	0V	11VDC
V 8	5Y3GT	Inf.	90KΩ	Inf.	210VAC	0V	210VAC	0V	220VDC

TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AK5	270KΩ	0Ω	0Ω	.2Ω	*2KΩ	1 Meg.	0Ω	
V 2	9002	*10KΩ	0Ω	0Ω	.2Ω	*10KΩ	65KΩ	0Ω	
V 3	6SG7	0Ω	.2Ω	25KΩ	0Ω	23KΩ	23KΩ	0Ω	*95Ω
V 4	6SK7	0Ω	.2Ω	52KΩ	10 Meg.	100Ω	52KΩ	0Ω	52KΩ
V 5	6J5	0Ω	0Ω	*6KΩ	Inf.	540KΩ	Inf.	.2Ω	38Ω
V 6	6J5	0Ω	0Ω	*100KΩ	Inf.	8KΩ	0Ω	.2Ω	4.7Ω
V 7	6V6GT	0Ω	.2Ω	*150Ω	*900Ω	470KΩ	Inf.	0Ω	470Ω
V 8	5Y3GT	Inf.	90KΩ	Inf.	260Ω	Inf.	260Ω	Inf.	90KΩ

* Measured from pin 6 of V8

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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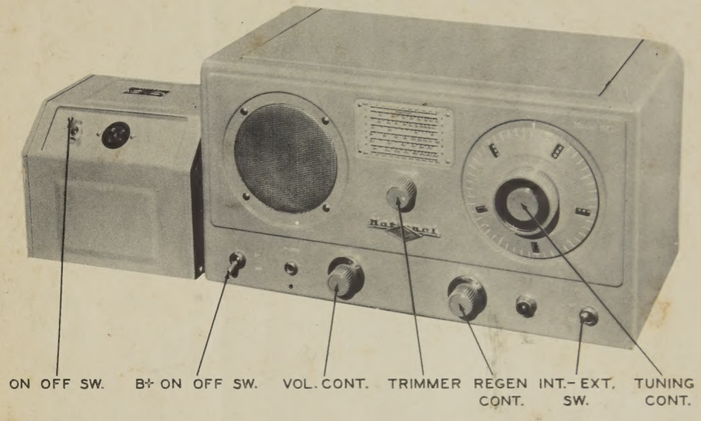
PHOTOFACT* Folder

NATIONAL MODEL HFS

NATIONAL MODEL HFS



NATIONAL MODEL HFS

TRADE NAME	National, Model HFS
MANUFACTURER	National Company, Inc., Malden, Mass.
TYPE SET	AC or Battery Operated Multi-Band Superheterodyne Receiver
TUBES(EIGHT)	Types 6AK5 Mixer, 9002 Oscillator, 6SG7 IF Amp., 6SK7 Detector, 6J5 Cathode Follower, 6J5 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier
POWER SUPPLY	110-120, 220-240 Volts AC or 6 Volt Storage Battery
RATING	.36 Amp. @ 117 Volts AC
TUNING RANGE-	Band F 27-42MC, Band E 41-60MC, Band D 56-80MC, Band C 80-120MC, Band B 120-178MC, Band A 178-250MC.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Connect the high side of the signal generator through .001 MFD shunted by 50KΩ resistor to the grid pin of the first detector coil socket. This will necessitate the removeable of the 1st detector coil from its socket. Connect low side of signal generator to chassis. Pre-set the front panel controls as follows: Audio------To desired volume
Int.-Ext.--Internal
Regeneration--Set for background hiss. (Approx. 4 on Knob Scale)
Absence of the background hiss indicates that the regeneration control and /or the signal generator should be retarded.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
.001MFD Shunted by 50KΩ	See Pre-alignment instructions.	10.7MC (400∿ Mod)	Point of Non-interference	Across voice coil	A1, A2 A3	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 7, Indiana

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NATIONAL MODEL HFS